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KODIAK MANAGEMENT AREA
1996 COMMERCIAL SAC ROE HERRING FISHERY
SEASON SUMMARY

By

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KODIAK MANAGEMENT AREA

1996 Sac Roe Herring Fishery Season Summary

INTRODUCTION

The Alaska Board of Fisheries (BOF) adopted new regulations for the Kodiak Management Area (KMA) sac roe herring fishery during its November 1995 meeting. These changes included the development of a regulatory harvest strategy and changes in purse seine and gillnet gear depth specifications. The BOF approved regulations took effect in 1996.

Portions of the new regulatory harvest strategy (5 AAC 27.535 e) have in essence been used by the Alaska Department of Fish and Game (ADF&G) Commercial Fisheries Management and Development Division staff since the early 1980's. Prior to and including the 1996 season the ADF&G has published an annual harvest strategy which informs fishers on how the fishery will be managed and establishes guideline harvest levels (GHL's) for management units (Gretsch et al 1996).

The major change addressed by the new regulatory harvest strategy is the shortening of fishing periods for purse seiners. This change resulted from ADF&G's inability to monitor purse seiners fishing during the night when near record levels of purse seine gear participated in the 1995 fishery. These factors prompted ADF&G to shorten the duration of fishing periods to slow the harvest rates of purse seiners (Gretsch 1995). Due to allocation concerns the shorter periods applied to both purse seine and gillnet fishers.

The new regulatory harvest strategy reduced fishing time for purse seine gear from 24 hour to 13 hour fishing periods, (12:00 noon to 10:00 p.m. on odd-numbered days and 9:00 a.m. to 12:00 noon on even numbered days of the week), from April 15 through May 4 (ADF&G 1996). From May 5 through June 30 the fishing periods for purse seiners are 12:00 noon on odd-numbered days to 12:00 noon on even-numbered days of the week, (24 hour periods). The ADF&G may adjust the May 5 date earlier or later depending on the assessment of effort levels, harvest rates, and ADF&G's ability to monitor the fishery. Gillnet fishing periods remain unchanged, with 24 hour fishing periods from 12:00 noon on odd-numbered days until 12:00 noon on even-numbered days of the week for the duration of the season.

The new purse seine gear specifications regulation allows for a maximum of 20 fathoms stretch measure in depth from the corkline to the bottom of the net including any lines which hang below the lead line. The new gillnet gear specifications regulation restricts nets to a maximum depth of 230 meshes and allows a total of four hours for fishers to pull their gear after an emergency closure, an increase of two hours from the previous regulation.

SEASON SUMMARY

The 1996 sac roe herring fishery season opened at 12:00 noon on April 15 and continued through June 30. The last harvest occurred on June 22 (Figure 1). From April 15 through April 30 purse seine fishing periods were restricted to 13 hour periods. In late April the purse seine, tender, and floating processor fleet participating in the KMA fishery diminished and moved to the Bristol Bay fishery. Harvest rates had also diminished in late April (Figure 1) and all of the ADF&G field crews were actively monitoring the primary management units where harvests were anticipated to occur during this time period. With this reduction in effort, reduced harvest rates, and good coverage of the fishery by ADF&G field crews purse seine fishing periods were increased to 24 hour openings followed by a 24 hour closure starting on May 1 for all management units, not previously closed due to a herring harvest.

A total of 131 permit holders made 1,092 deliveries during the 1996 season, with 57 purse seiners and 74 gillnetters harvesting 3,386 tons (Table 1 and Figure 2). Approximately 78 purse seiners participated in this years fishery and about 20 vessels did not make any landings for the season. The total 1996 guideline harvest level (GHL) was 4,180 tons which was distributed among 46 management units within the KMA and harvests occurred within 43 management units (Table 2). The 1996 harvest of 3,386 tons was the fifth largest harvest in the history of this fishery and was 794 tons less than total KMA GHL of 4,180 tons (Figure 3). Purse seine gear accounted for 69% (2,322 tons) of the harvest with gillnet gear accounting for 31% (1,064 tons) (Figure 4). From 1979-1996 the percentage of harvest for purse seine gear has ranged from 84% to 60% of the total catch and gillnet gear has ranged from 40% to 15%. A total of 102 tenders were registered to transport herring to processors. There were 11 floating processors and 7 shore based plants represented by 15 different companies registered to process herring in the KMA in 1996, which is down by one floating processor from the 1995 season. Roe recovery percentages averaged 10.9% for seine gear which is up over one percent from the 1995 fishery and gillnet gear averaged 10.6% roe recovery which is down slightly from the 1995 fishery.

The 1996 fishery was monitored by four ADF&G shorebased mobile field crews, two ADF&G vessels, along with assistance from two Fish and Wildlife Protection vessels which were stationed in anticipated herring harvest locations. These crews monitored the fishery to collect effort and harvest data used to manage the fishery, along with commercial catch samples to obtain AWL data. A total of 20 emergency orders were issued during the season which established fishing periods or closed management units when GHL's had been reached.

The reduction in purse seine fishing periods for the 1996 season has greatly aided the management of this fishery. During the first two weeks of the season when effort levels are the highest the 13 hour fishing periods were crucial in controlling the harvest in this fishery and preventing overexploitation of KMA herring stocks. Prior to the 1996 season it was very difficult and dangerous for ADF&G's field crews to monitor the seine fleet in darkness (10:00 p.m. to 6:00 a.m.) from small rafts and skiffs.

With the new 10:00 p.m. seine fishery closure time the ADF&G field crews still must monitor the fishery during some periods of darkness during the first two weeks of the season. Generally, the seine fishery catches improve as darkness approaches with fishery activity intensifying at or near the 10:00 p.m. closure time, which is related to herring moving up in the water column near darkness. Catches which occur near 10:00 p.m. may take several hours to be loaded aboard a tender, which requires the

field crews to be present to assess the harvest and evaluate the need to close a management unit if the GHL has been met. The 10:00 p.m. closure time has eliminated the unrestricted seine fishery during the night and has reduced the time field crews must work in potentially dangerous situations. For the 1997 season ADF&G is considering adding additional reporting requirements for tenders and purse seiners to report to field crews the current catch data after the 10:00 p.m. closure time by radio contact which will further reduce the time field crews spend on the water at night .

In attempting to evaluate the success of the new harvest strategy at preventing an excessive harvest from occurring on a particular herring stock there are many factors which contribute to high harvest rates within the KMA fishery, such as high gear levels, a large available biomass to harvest, etc. The one aspect of the 1996 fishery which can be used to help evaluate the new harvest strategy at this time is a comparison of the GHL to the actual harvest during the 1996 fishery. For the West Afognak District the total GHL was 1,180 tons and the actual harvest for the season was 944 tons (Table 2). During the period of April 15-30 when gear levels were the highest the Malina and Paramanof Bay management units had a combined GHL of 700 tons and 814 tons were actually harvested, these units were closed on April 26 and 17 respectively. In the Uganik District the total GHL was 935 tons the actual harvest was 963 tons. During the high gear level time period (April 15-30) the Viekada, Village Island, and East Arm Uganik management units had a combined GHL of 425 tons and 516 tons were actually harvested, with closures occurring on April 26, 17, and 20 respectively. For the Alitak District the total GHL was 530 tons and the actual harvest was 449 tons and there were no closures of management units during the April 15-30 time period. For the Eastside District the total GHL was 1,190 tons and the actual harvest was 825 tons and only the Barling Bay management unit was closed during the April 15-30 period with a GHL of 50 tons and harvest of 54 tons. The Northeast District had a total GHL of 80 tons and the actual harvest was 54 tons and there was no closure of management units during the April 15-30 time period. For the three Mainland Districts the combined GHL was 235 tons and the actual harvest was 150 tons and there were no closures of management units during the April 15-30 time period. Overall ADF&G was successful in monitoring the 1996 fishery, there were no excessive harvests in any management units, unlike the 1995 season with a harvest of 801 tons from the Foul Bay management unit which had a 75 ton GHL or the 1994 harvest of 1,093 tons from the South Arm Uganik Bay management unit which had a 75 ton GHL.

CATCH SAMPLING

Age, weight, and length (AWL) data was collected from the purse seine harvest from 26 management units. Further, there was one sample collected from a gillnet harvest (Raspberry Strait) and one sample taken from an ADF&G gillnet from Zachar Bay, a closed area. With all samples combined age-3 herring were the dominant age class harvested in the 1996 season, representing 39% of the total harvest (Table 3). The remaining age classes represented the following percentage of the harvest; age-2 (1%), age-4 (6%), age-5 (11%), age-6 (5%), age-7 (2%), age-8 (23%), age-9 (10%) and age 10+ (3%) (Figure 5). The average weight for purse seine caught herring was 171 grams (Table 4) which is down from the 1995 fishery average of 209 grams, a year which had approximately 37% age-7 herring in the harvest.

EXVESSEL VALUE OF THE FISHERY

The average price paid for 10% roe recovery herring was approximately \$2,000 per ton for the KMA. This was the highest price paid per ton in the history of this fishery. The average exvessel earnings for purse seine fishers was a record \$81,500 and for gillnetters a record \$28,800 (Figure 6). The total exvessel value of the fishery was estimated at a record \$6.8 million, which is over twice the 1986-1995 average value of the fishery at \$2.8 million (Figure 7).

1997 HARVEST EXPECTATIONS AND STOCK STATUS

Herring harvests in the West Afognak and Uganik Districts have relied strongly on a dominant single age class of herring to support these fisheries in recent years, primarily age-8 herring in the 1996 season. Several management units within these districts experienced good to excellent recruitment of age-3 herring in the 1996 fishery. Similarly, the management units of the Eastside District and some management units of the Alitak District have also relied on a strong single age class, age-9 in the 1996 season, to support the fishery. The 1996 harvest of age-3 herring in these districts also indicate good to excellent recruitment for these districts.

The abundance of age-3 herring in the 1996 fishery, along with industry spotter reports and fisher observations of age-2 herring, indicates good to excellent recruitment for the West Afognak, Uganik, Eastside, and Alitak Districts. Age-3, age-4, and age-9 year old herring are expected to comprise the majority of the 1997 harvest for these districts. The Uyak, North Afognak, and South Afognak Districts were closed for the 1995 and 1996 seasons due to a decline in herring abundance over the last five years. These management units will likely be closed to fishing again for the 1997 season in an effort to help rebuild these stocks.

The preliminary 1997 GHL for the KMA sac roe herring fishery will be range from approximately 3,500 to 4,000 tons. Adjustments increasing or decreasing management unit GHL's will be under evaluation during the winter of 1997 and will be published in the Kodiak Sac Roe Herring Harvest Strategy, in mid-March of 1997.

LITERATURE CITED

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- Gretsch, D.R., D. L. Prokopowich, and K.R. Brennan 1996. Kodiak Management Area Sac Roe Herring Harvest Strategy , 1996. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Regional Information Report 4K96-17, Kodiak.

Table 1. Sac roe herring fishery summary of season length, guideline harvest levels, harvest data by gear type, percentage of harvest by gear type, number of landings, and exvessel earnings, Kodiak Management Area, 1979-1996.

Year	Season Length (Days)	G-H-L (Tons)	Total Harvest (Tons)	Harvest by Gear Type		Percent Harvest by Gear Type		Number of Landings by Gear Type		Units of Gear Making Landings		Average Catch by Gear Type		Average Earnings		Price per Ton (\$)	Exvessel Total Value (\$)
				Seine (Tons)	Gillnet (Tons)	Seine	Gillnet	Seine	Gillnet	Seine	Gillnet	Seine (Tons)	Gillnet (Tons)	Seine (\$)	Gillnet (\$)		
1979	36	2,400	1,735	1,457	278	84%	16%	-	-	57	125	26	2	\$ 38,342	\$ 3,336	\$ 1,500	\$ 2,602,500
1980	35	2,400	2,383	2,009	374	84%	16%	-	-	92	109	22	3	\$ 15,068	\$ 2,368	\$ 690	\$ 1,644,270
1981	48	2,400	2,065	1,596	469	77%	23%	207	406	79	114	20	4	\$ 14,647	\$ 2,983	\$ 725	\$ 1,497,125
1982	59	2,400	1,771	1,447	324	82%	18%	138	191	45	67	32	5	\$ 17,686	\$ 2,660	\$ 550	\$ 974,050
1983	51	2,400	2,319	1,797	522	77%	23%	164	284	41	64	44	8	\$ 35,063	\$ 6,525	\$ 800	\$ 1,855,200
1984	54	2,400	2,163	1,691	472	78%	22%	138	212	39	69	43	7	\$ 34,687	\$ 5,472	\$ 800	\$ 1,730,400
1985	59	2,000	1,968	1,244	724	63%	37%	118	348	34	81	37	9	\$ 32,929	\$ 8,044	\$ 900	\$ 1,771,200
1986	61	1,690	1,558	1,110	448	71%	29%	132	385	31	71	36	6	\$ 34,016	\$ 5,994	\$ 950	\$ 1,480,100
1987	61	1,640	2,146	1,591	554	74%	26%	122	411	29	62	55	9	\$ 54,862	\$ 8,935	\$ 1,000	\$ 2,146,000
1988	59	2,065	2,171	1,304	867	60%	40%	169	555	33	76	40	11	\$ 51,370	\$ 14,830	\$ 1,300	\$ 2,822,300
1989	76	2,415	2,249	1,513	736	67%	33%	171	627	37	83	41	9	\$ 34,749	\$ 7,535	\$ 850	\$ 1,911,149
1990	75	2,375	2,347	1,644	703	70%	30%	156	544	27	63	61	11	\$ 51,756	\$ 9,485	\$ 850	\$ 1,994,950
1991	83	2,510	2,432	1,697	735	70%	30%	169	587	32	64	53	11	\$ 45,077	\$ 9,762	\$ 850	\$ 2,067,200
1992	77	2,720	4,283	3,260	1,023	76%	24%	185	706	40	74	82	14	\$ 40,750	\$ 6,912	\$ 500	\$ 2,141,500
1993	77	3,525	4,929	4,203	726	85%	15%	237	294	41	86	103	8	\$ 56,382	\$ 4,643	\$ 550	\$ 2,710,950
1994	71	4,550	5,893	4,976	917	84%	16%	285	485	66	57	75	16	\$ 60,315	\$ 12,870	\$ 800	\$ 4,714,400
1995	73	4,480	4,604	3,837	768	83%	17%	280	642	73	71	53	11	\$ 66,858	\$ 13,759	\$ 1,272	\$ 5,856,288
1996	69	4,180	3,386	2,322	1,064	69%	31%	202	890	57	74	41	14	\$ 81,474	\$ 28,757	\$ 2,000	\$ 6,772,000
Averages																	
1979-1995	62	2,610	2,766	2,140	626	76%	24%	157	393	47	79	48	9	\$40,268	\$7,418	\$876	\$2,348,211
1991-1995	76	3,557	4,428	3,595	834	80%	20%	231	543	50	70	73	12	\$53,876	\$9,589	\$794	\$ 3,498,068
1986-1995	71	2,797	3,261	2,514	748	74%	26%	191	524	41	71	60	11	\$49,613	\$9,473	\$892	\$ 2,784,484

Table 2. Sac roe herring fishery guideline harvest level by management unit, harvest by gear type, total harvest, and the date each management unit was closed, Kodiak Management Area, 1996.

STAT. AREA	MGMT. UNIT	GUIDELINE HARVEST LEVEL (Tons)	SEINE HARVEST (Tons)	GILLNET HARVEST (Tons)	TOTAL HARVEST (Tons)	DATE UNIT CLOSED
NORTH AFOGNAK DISTRICT						
NA10	Shuyak Is.	20	0	0	0	6/30
NA20	Delphin Bay	Closed	0	0	0	-
NA30	Perenos Bay	Closed	0	0	0	-
NA40	Seal Bay	Closed	0	0	0	-
NA50	Tonki Bay	Closed	0	0	0	-
District Total		20	0	0	0	-
WEST AFOGNAK DISTRICT						
WA10	Raspberry St.	300	0	3.8	3.8	6/30
WA20	Malina Bay	200	116.1	2.2	118.3	4/26
WA31	Paramanof Bay	500	538.0	157.4	695.4	4/17
WA32	Foul Bay	150	108.9	15.0	123.9	5/4
WA40	Devils Inlet	10	0	0	0	6/30
WA40	Blue Fox	20	0	2.6	2.6	6/30
WA50	Offshore W. Afog. ^a	-	0	0	0	6/30
District Total		1,180	763.0	181.0	944.0	-
SOUTH AFOGNAK DISTRICT						
SA10	Izhut Bay	Closed	0	0	0	-
SA20	Kitoi Bay	Closed	0	0	0	-
SA30	MacDonalds Lagoon	Closed	0	0	0	-
SA40	Danger Bay	Closed	0	0	0	-
SA50	Litnik	Closed	0	0	0	-
SA60	Duck Bay	Closed	0	0	0	-
District Total		Closed	0	0	0	-
UGANIK DISTRICT						
UG10	Kupreanof	10	0	0.1	0.1	6/30
UG20	Viekoda	50	69.2	1.7	70.9	4/26
UG21	Terror	250	32.7	83.9	116.6	6/30
UG30	Village Island	250	305.6	27.0	332.6	4/17
UG31	W. Uganik Pass	40	24.9	11.3	36.2	5/10
UG32	NE Arm Uganik	30	10.3	0	10.3	6/30
UG33	E. Arm Uganik	125	82.0	30.7	112.7	4/20
UG34	S. Arm Uganik	180	191.4	91.9	283.3	5/4
UG40	Offshore Uganik ^a	-	0	0	0	6/30
District Total		935	716.1	246.6	962.7	-
UYAK DISTRICT						
UY10	Offshore Uyak ^a	Closed	0	0	0	-
UY20	Harvester Island	Closed	0	0	0	-
UY30	Inner Uyak	Closed	0	0	0	-
UY32	Browns Lagoon	Closed	0	0	0	-
UY31	Larsen Bay	Closed	0	0	0	-
UY40	Zachar Bay	Closed	0	0	0	-
UY50	Spiridon Bay	Closed	0	0	0	-
District Total		Closed	0	0	0	-

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Table 2. (page 2 of 3)

STAT. AREA	MGMT. UNIT	GUIDELINE HARVEST LEVEL (Tons)	SEINE HARVEST (Tons)	GILLNET HARVEST (Tons)	TOTAL HARVEST (Tons)	DATE UNIT CLOSED
ALITAK DISTRICT						
AL10	Outer Alitak (Exploration)		0	0	0	6/30
AL20	Inner Alitak (Exploration)		0	3.0	3.0	6/30
AL21	In. Deadman Bay	40	12.9	0.1	13.0	6/30
AL22	Outer Deadman Bay	95	22.8	1.0	23.8	6/30
AL30	Sulua Bay	240	107.2	180.8	288.0	5/4
AL31	Portage Bay	75	69.8	6.1	75.9	5/22
AL40	Lower Olga/Moser	15	0	2.2	2.2	6/30
AL41	No. Upper Olga Bay	10	0	0	0	6/30
AL50	Upper Olga Bay	40	10.2	0	10.2	6/30
AL60	Geese/Twoheaded	15	33.2	0	33.2	5/10
District Total		530	256.1	193.2	449.3	
STURGEON/HALIBUT DISTRICT						
SH10	Sturg./Halibut (Exploration)		0	0	0	6/30
EASTSIDE DISTRICT						
EA10	Kaiugnak	20	0	0	0	6/30
EA20	SW. Sitkalidak	20	0	2.3	2.3	6/30
EA21	Three Saints Bay	40	41.3	6.0	47.3	5/9
EA22	Newman Bay	20	9.0	2.9	11.9	6/30
EA23	W. Sitkalidak St.	275	38.2	34.3	72.5	6/30
EA24	Barling Bay	50	25.6	28.7	54.3	4/21
EA30	E. Sitkalidak St.	300	94.9	133.7	228.6	6/30
EA31	Tanginak Anchorage	15	0	1.4	1.4	6/30
EA40	Outer Sitka. (Exploration)		0	0	0	6/30
EA41	Boulder Bay (Exploration)		15.4	6.2	21.6	6/30
EA42	Shearwater Bay	90	0	53.5	53.5	5/2
EA43	Outer Kiliuda Bay	90	84.9	18.9	103.8	5/7
EA44	Inner Kiliuda Bay	90	77.5	2.4	79.9	5/11
EA50	Outer Ugak Bay	60	9.9	44.3	54.2	5/8
EA51	Inner Ugak Bay	90	7.5	86.6	94.1	5/13
EA52	Pasagshak	30	0	0.1	0.1	6/30
District Total		1,190	404.2	421.3	825.5	
NORTHEAST DISTRICT						
NE10	Womens Bay	50	44.6	5.3	49.9	6/4
NE20	Kalsin Bay	10	0	4.4	4.4	6/30
NE30	Middle Bay	10	0	0.2	0.2	6/30
NE40	Inshore Chiniak	10	0	0	0	6/30
NE50	Off. Chiniak (Exploration)		0	0	0	6/30
District Total		80	44.6	9.9	54.5	
INNER MARMOT DISTRICT						
IM10	Monashka Bay (Exploration)		0	0	0	6/30
IM20	Anton Larsen Bay	Closed	0	0	0	-
IM30	Sharatin Bay	Closed	0	0	0	-
IM40	Kizhuyak Bay	Closed	0	0	0	-
IM50	Spruce Island	10	0.2	0.3	0.5	6/30
District Total		10	0.2	0.3	0.5	

-Continued-

Table 2. (page 3 of 3)

STAT. AREA	MGMT. UNIT	GUIDELINE HARVEST LEVEL (Tons)	SEINE HARVEST (Tons)	GILLNET HARVEST (Tons)	TOTAL HARVEST (Tons)	DATE UNIT CLOSED
NORTH MAINLAND DISTRICT						
NM10	Hallo Bay	(Exploration)	0	0	0	6/30
NM20	Inner Kukak	50	0	11.9	11.9	6/30
NM30	Outer Kukak	-	0	0	0	6/30
NM40	Missak Bay	(Exploration)	0	0	0	6/30
District Total		50	0	11.9	11.9	
MID MAINLAND DISTRICT						
MM10	Inner Katmai	50	63.3	0	63.3	5/13
MM20	Outer Katmai	-	0	0	0	6/30
MM30	Alinchak	40	20.2	0	20.2	6/30
MM40	Puale Bay	(Exploration)	0	0	0	6/30
MM50	Portage Bay	(Exploration)	0	0	0	6/30
MM60	Outer Portage ^a	-	0	0	0	6/30
District Total		90	83.5	0	83.5	
SOUTH MAINLAND DISTRICT						
SM10	Wide Bay	95	54.6	0	54.6	6/30
SM20	Low. Shelikof	(Exploration)	0	0	0	6/30
District Total		95	54.6	0	54.6	
GRAND TOTAL		4,180	2,322.3	1,064.2	3,386.5	

^a These are offshore management units which are not expected to yield herring of sac roe quality. These units are more applicable to the food/bait fishery. (See Herring Food/Bait Fishery Management Plan.)

Table 3. Age Composition by percent of sac roe herring stocks, Kodiak Management Area, 1996.^{a, b}

Area	Harvest (tons)	Percent at Age										N
		2	3	4	5	6	7	8	9	10	11+	
Raspberry Straits	4	-	-	6.8	15.9	13.6	11.3	47.7	4.5	-	-	44
Malina Bay	118	-	15.9	7.0	10.5	9.4	1.6	52.2	2.1	-	1.0	371
Paramanof Bay	695	.3	22.7	7.2	3.2	5.4	2.7	52.7	3.6	-	1.8	610
Foul Bay	124	-	38.2	14.3	13.2	9.6	1.8	21.4	.4	-	.7	424
Viekoda Bay	71	-	87.3	7.8	1.3	.8	-	2.6	-	-	-	229
Terror Bay	117	2.6	65.9	10.9	3.5	4.9	1.4	7.8	.4	.4	1.8	485
Village Islands	333	-	1.4	3.1	8.6	11.1	1.9	69.0	3.6	-	.9	414
W. Uganik Passage	36	-	23.9	6.2	7.2	5.2	2.0	25.0	11.4	4.1	14.5	96
N.E. Arm Uganik	10	3.7	38.8	6.7	11.1	1.4	2.2	4.4	7.4	1.4	22.3	134
E. Arm Uganik	113	.5	6.5	5.7	6.8	10.2	1.8	63.6	3.9	-	.7	382
S. Arm Uganik	283	.3	6.0	4.6	10.7	10.3	4.0	57.5	4.3	-	2.0	299
Zachar Bay ^c	-	-	-	8.5	40.4	8.5	8.5	23.4	8.5	-	2.1	47
Inner Deadman Bay	13	-	7.1	10.0	44.2	8.5	4.2	21.4	4.2	-	-	70
Sulua Bay	288	-	1.0	6.2	31.2	14.5	1.0	43.7	2.0	-	-	96
Portage Bay	76	-	10.3	2.7	35.3	-	-	10.8	30.4	1.6	8.6	184
Upper Olga Bay	10	5.4	42.8	7.1	15.9	1.6	9.3	3.8	2.7	9.3	1.6	182
Geese-Twoheaded	33	-	41.0	12.5	37.5	1.7	-	3.5	3.5	-	-	56
Three Saints Bay	47	1.7	79.4	.5	2.2	-	-	.5	14.2	-	1.1	175
W. Sitkalidak	73	-	66.1	6.1	17.9	1.5	-	2.0	5.6	-	.5	195
Barling Bay	54	-	27.4	8.6	27.9	5.9	.5	13.9	14.5	1.0	-	186
E. Sitkalidak	229	-	37.7	3.4	16.0	5.3	.3	11.8	20.6	.7	3.8	262
Outer Kiliuda Bay	104	-	9.6	2.3	18.4	2.3	1.8	4.1	60.3	.4	.4	217
Inner Kiliuda Bay	80	1.7	34.2	1.9	12.1	1.9	1.3	3.5	42.8	-	-	502
Shearwater Bay	54	-	-	4.1	27.7	-	-	4.1	62.5	1.3	-	72
Inner Ugak Bay	94	-	88.2	-	1.3	-	1.1	.2	7.8	.4	.6	444
Womans Bay	50	.3	97.8	.1	.3	.3	.1	-	.3	-	.1	502
Inner Katmai Bay	63	-	23.7	21.7	34.6	1.9	8.9	8.9	-	-	-	101
Wide Bay	55	-	16.2	36.9	32.4	7.2	1.8	5.4	-	-	-	111
28 Mgmt. Units	3,227	.6	38.6	6.2	11.4	5.0	1.8	23.3	10.4	.5	1.7	6,890

^a Of the 41 stocks exploited in 1996, samples were collected from 27 (68%). These 27 stocks yielded 3,227 tons or 95% of the management area's total harvest of 3386 tons.

^b The above samples were collected by ADF&G employees from commercial herring seine catches with the exception of a gillnet caught sample from Raspberry Straits, a combined commercial gillnet and seine caught sample from Shearwater, and the variable mesh gillnet sample caught by ADF&G employees in Zachar Bay.

^c No harvest was allowed in Zachar Bay for 1996.

Table 4. Average weight in grams, by age, of sac roe herring stocks, Kodiak Management Area, 1996.^{a, b}

Area	Harvest (tons)	Average Weight at Age											Avg.	N
		2	3	4	5	6	7	8	9	10	11+			
Raspberry Straits	4	-	-	191	184	182	227	218	229	-	-	207	44	
Malina Bay	118	-	89	128	165	186	194	227	229	-	253	187	371	
Paramanof Bay	695	43	86	116	162	194	202	229	254	-	283	185	606	
Foul Bay	124	-	89	119	160	179	210	220	227	-	268	144	422	
Viekoda Bay	71	-	84	108	138	151	-	195	-	-	-	90	228	
Terror Bay	117	40	83	120	160	188	203	211	266	275	270	111	484	
Village Islands	333	-	109	139	163	189	217	217	238	-	251	207	414	
W. Uganik Passage	36	-	88	131	193	195	248	238	274	293	320	209	96	
N.E. Arm Uganik	10	68	111	132	202	175	228	225	273	313	308	189	134	
E. Arm Uganik	113	39	92	128	172	178	216	228	242	-	285	204	329	
S. Arm Uganik	283	52	95	128	169	183	205	219	219	-	269	198	298	
Zachar Bay ^c	-	-	-	186	196	217	271	260	264	-	299	226	47	
Inner Deadman Bay	13	-	113	157	208	251	282	258	297	-	-	217	70	
Sulua Bay	288	-	131	180	191	238	254	268	320	-	-	234	96	
Portage Bay	76	-	116	143	201	-	-	283	302	332	325	243	183	
Upper Olga Bay	10	65	120	159	194	246	238	254	267	271	341	172	182	
Geese-Twoheaded	33	-	117	163	197	207	-	282	262	-	-	166	56	
Three Saints Bay	47	47	96	156	189	-	-	385	306	-	342	132	175	
W. Sitkalidak	73	-	108	141	188	214	-	242	287	-	257	140	192	
Barling Bay	54	-	104	160	210	219	228	274	314	310	-	203	185	
E. Sitkalidak	229	-	106	175	204	202	310	268	300	300	348	200	261	
Outer Kiliuda Bay	104	-	88	160	207	217	272	274	304	296	295	258	216	
Inner Kiliuda Bay	80	28	95	165	203	210	254	292	301	-	-	220	460	
Shearwater Bay	54	-	-	180	215	-	-	280	301	240	-	274	66	
Inner Ugak Bay	94	-	84	-	184	-	259	328	299	259	348	108	442	
Womans Bay	50	58	95	106	157	184	236	-	285	-	330	97	502	
Inner Katmai Bay	63	-	92	131	172	237	245	274	-	-	-	161	101	
Wide Bay	55	-	100	130	170	199	240	245	-	-	-	150	109	
28 Mgmt. Units	3,227	52	93	132	187	193	227	230	294	284	305	171	6,768	

^a Of the 41 stocks exploited in 1996, samples were collected from 27 (68%). These 27 stocks yielded 3,227 tons or 95% of the management area's total harvest of 3386 tons.

^b The above samples were collected by ADF&G employees from commercial herring seine catches with the exception of a gillnet caught sample from Raspberry Straits, a combined commercial gillnet and seine caught sample from Shearwater, and the variable mesh gillnet sample caught by ADF&G employees in Zachar Bay.

^c No harvest was allowed in Zachar Bay for 1996.

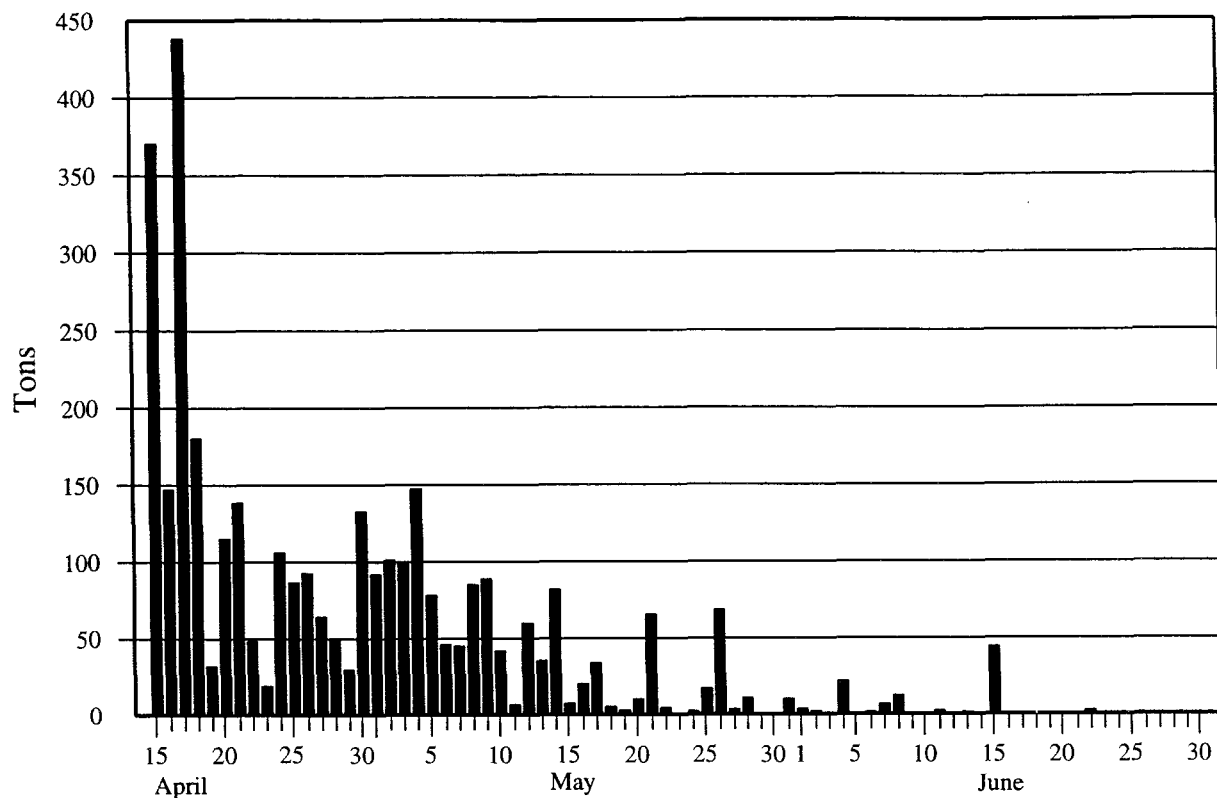


Figure 1. Sac roe herring harvest by day for the Kodiak Management Area, 1996.

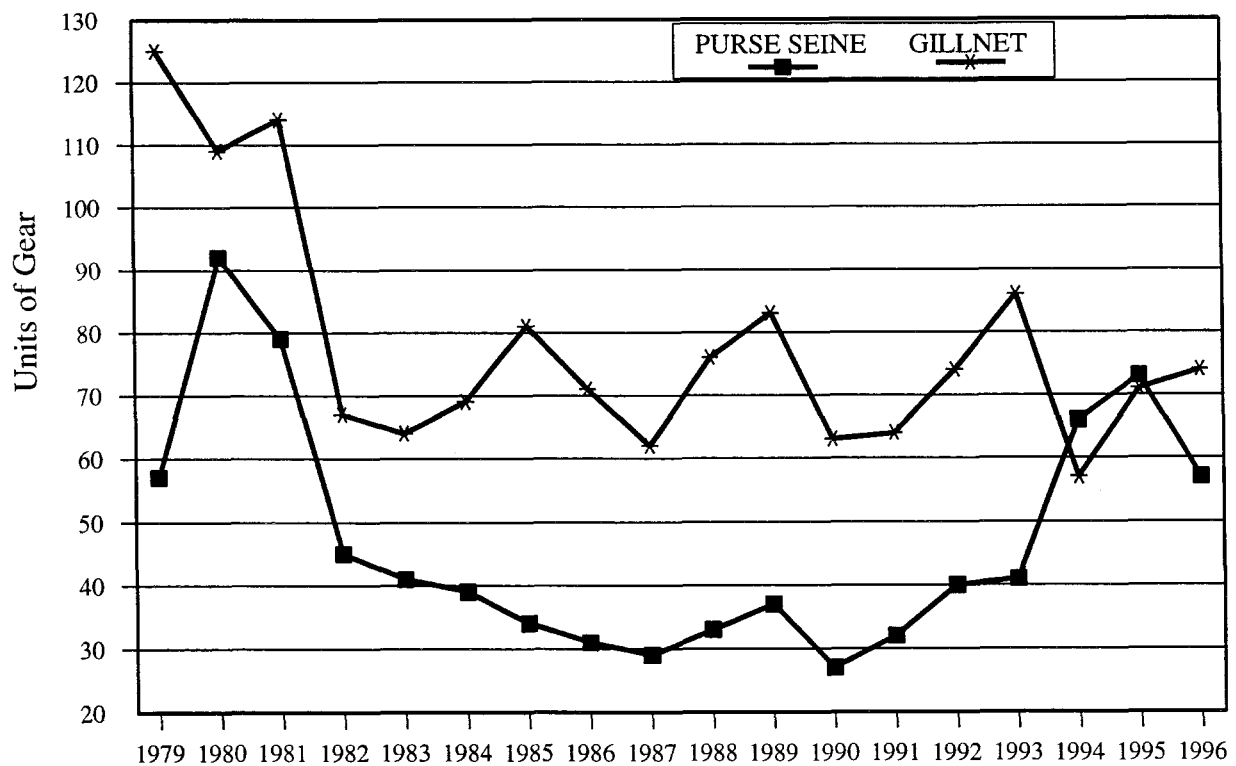


Figure 2. Number of units of each gear type which made landings in the Kodiak Management Area sac roe herring fishery, 1979-1996.

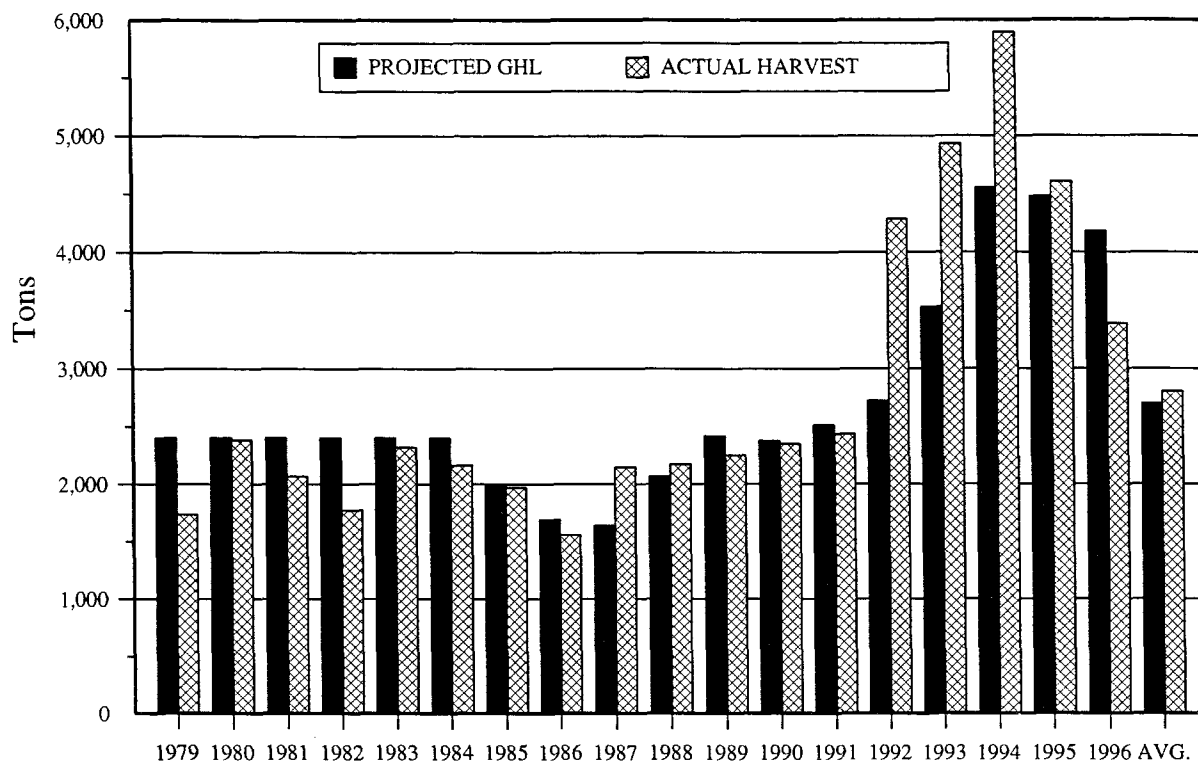


Figure 3. Comparison of the projected guideline harvest level (GHL) to the actual sac roe herring harvest in the Kodiak Management Area, 1979 - 1996.

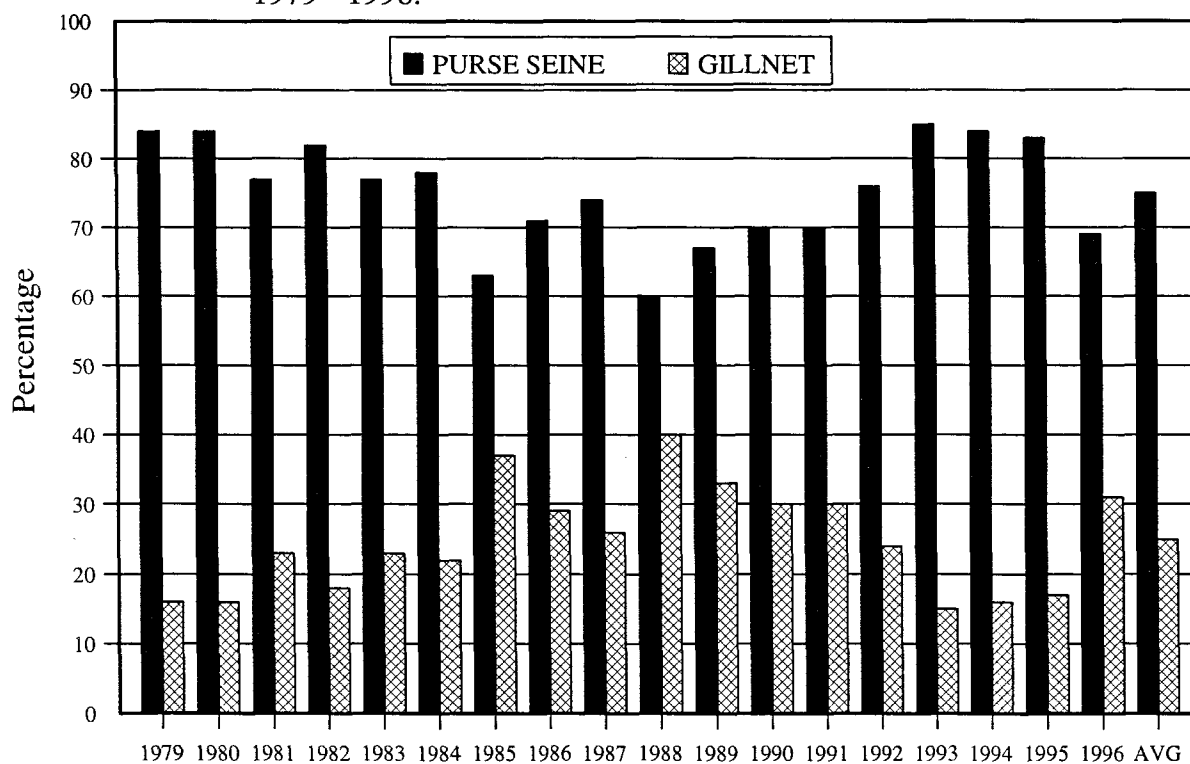
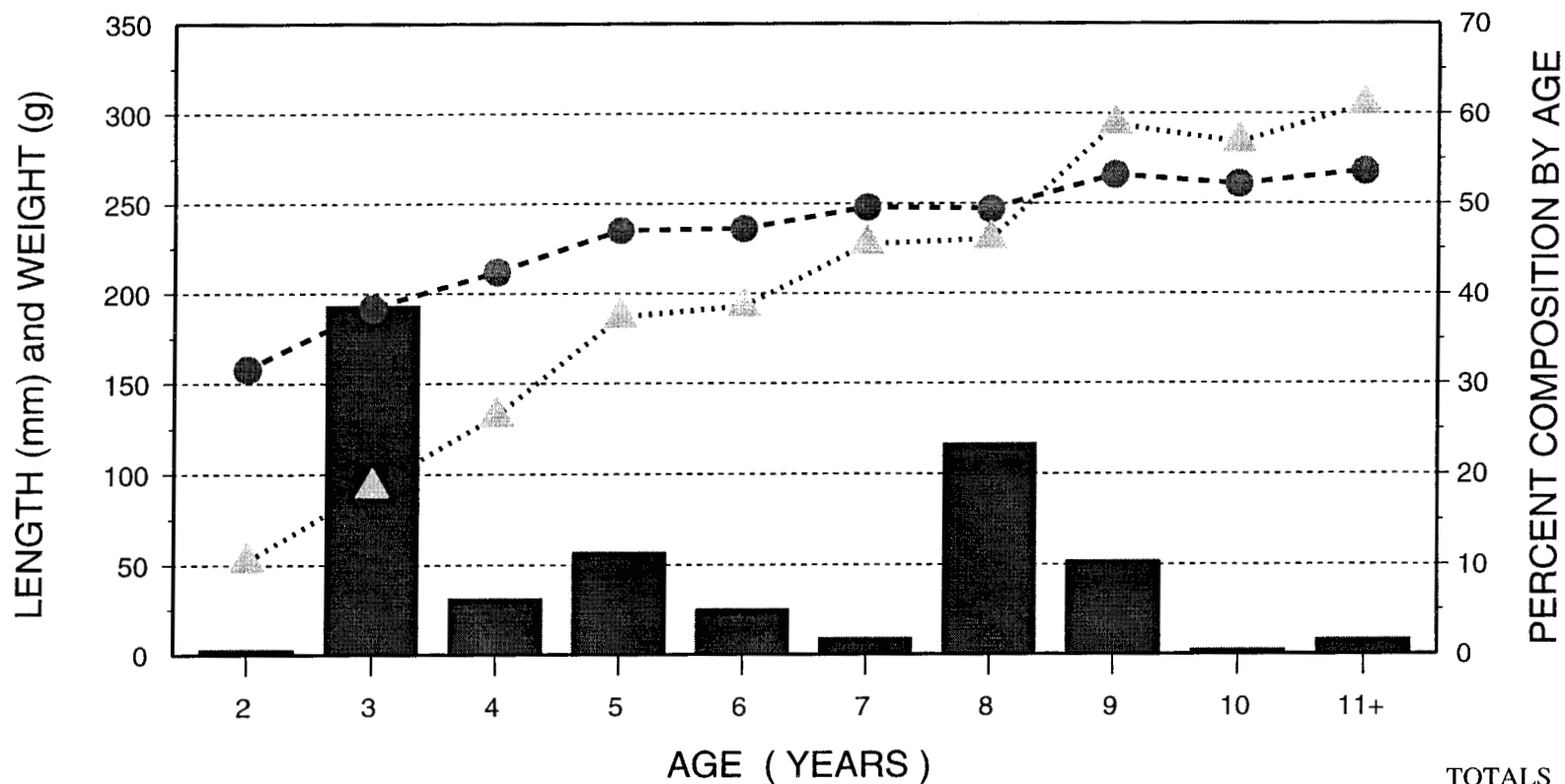


Figure 4. Percent of sac roe herring harvest by gear type for the Kodiak Management Area, 1979 - 1996.

Figure 5. Summary of sac roe herring average length and weight at age, and percent of each age class in catch samples, in the Kodiak Management Area, 1996.



N	47	2666	431	786	347	130	1608	717	36	122	6890
% BY AGE	0.6	38.6	6.2	11.4	5.0	1.8	23.3	10.4	0.5	1.7	100%
N	39	2619	423	778	339	129	1574	710	36	121	6768
AVG. WEIGHT (g)	52	93	132	187	193	227	230	294	284	305	171
N	46	2631	427	785	341	130	1574	712	36	121	6803
AVG. LENGTH (mm.)	158	192	212	235	236	248	247	266	261	268	223



Figure 6. Average earnings (dollars) by year and gear type for the sac roe herring fishery, Kodiak Management Area, 1979 - 1996.

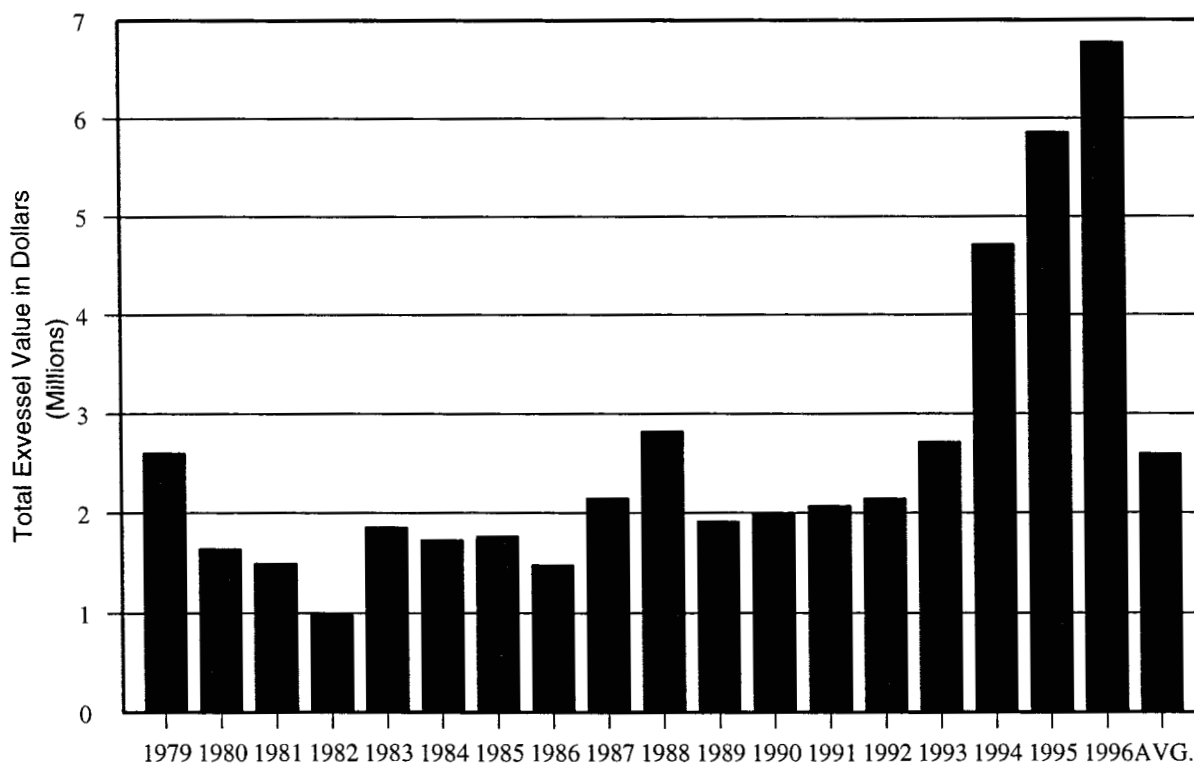


Figure 7. Total exvessel value (dollars) by year for the sac roe herring fishery in the Kodiak Management Area, 1979 - 1996.

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